

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Trimethylamine	Trade Name: Trimethylamine
Product Use: Many	
Chemical Name: N,N-Dimethylmethanamine	Synonym: TMA
Chemical Formula: (CH ₃) ₃ N	Chemical Family: Amine
Telephone: Emergencies: * 1-800-363-0042	Supplier /Manufacture: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2 Phone: 905-803-1600 Fax: 905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Composition and Information on Ingredients

INGREDIENTS	% (VOL)	CAS NUMBER	LD ₅₀ (Species & Routes)	LC ₅₀ (Rat, 4 hrs.)	TLV-TWA (ACGIH)
Trimethylamine	100	75-50-3	50mg/kg(rat)	3500 ppm(rat)	5 ppm (ACIGH)

3. Hazards Identification

Emergency Overview

DANGER! Flammable, corrosive liquid and gas under pressure. Harmful if inhaled. Can cause eye, skin, and respiratory tract burns. Can form explosive mixtures with air. May cause liver, kidney, and heart damage. Self-contained breathing apparatus and protective clothing must be worn by rescue workers.

ROUTES OF EXPOSURE:

Inhalation. Swallowing. Skin absorption. Skin contact. Eye contact.

THRESHOLD LIMIT VALUE: TLV-TWA Data from 2007 Guide to Occupational Exposure Values (ACGIH). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION: Causes irritation of eyes, nose, throat, and lungs, with coughing, difficult breathing, chemical pneumonitis or bronchitis, pulmonary edema, and possible liver damage. Lack of oxygen can cause death. STEL: 15 ppm (ACGIH, OSHA).

SKIN CONTACT:

Causes irritation seen as local redness and swelling, with necrosis. Liquid may be corrosive and cause frostbite.

SKIN ABSORPTION:

Prolonged or widespread skin contact with the liquid may result in the absorption of harmful amounts of material.

SWALLOWING:

An unlikely route of exposure. This product is a gas at room temperature and pressure, but liquid is highly toxic and may cause frostbite of the lips and mouth, irritation of the mouth and throat with abdominal pain, nausea, vomiting, dizziness, faintness, weakness, drowsiness, and coma. May cause liver damage.

EYE CONTACT:

Causes severe irritation seen as marked excess redness and swelling of the conjunctiva, corneal opacity may occur. Liquid may cause frostbite. Vapour may cause temporary disturbance of vision.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

No evidence of adverse effects from available information.

OTHER EFFECTS OF OVEREXPOSURE:

Skin contact may result in the development of an allergic skin reaction. Secondary and tertiary amines may react with nitrites to form nitrosamines. Some nitrosamines have been shown to be carcinogenic in laboratory animals.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

Repeated or prolonged exposure is not known to aggravate medical condition.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

Breathing of vapour and/or mist may aggravate asthma and inflammatory or fibrotic pulmonary disease.

CARCINOGENICITY:

Not listed as carcinogen by OSHA, NTP or IARC.

4. First Aid Measures**INHALATION:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration(Rescuer may receive chemical burns as a result of giving mouth-to-mouth-mouth). If breathing is difficult, give oxygen. Get medical attention.

SKIN CONTACT:

Immediately remove contaminated clothing and flush skin with plenty of water. Wash clothing before reuse. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 41°C. In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician. Wash cloth before use. Remove contaminated shoes.

SWALLOWING:

This product is a gas at normal temperature and pressure. Give two glasses of water. Do not induce vomiting. Call a physician.

EYE CONTACT:

For contact with the liquid, immediately flush eyes throughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:

If exposure is severe, hospitalization and observation for 72 hours for delayed onset of severe pulmonary edema are advisable. Treatment of overexposure should be directed at the control of symptoms and the clinical condition. Exposure to the vapour may cause minor transient edema of the corneal epithelium. This condition, referred to as "glauropsia", "blue haze", or "blue-gray haze", produces a blurring of vision against a general bluish haze and the appearance of halos around bright objects. The effect disappears spontaneously within a few hours of the end of an exposure, and leaves no sequelae. Although not detrimental to the eye per se, glauropsia predisposes an affected individual to physical accidents and reduces the ability to undertake skilled tasks such as driving a motorized vehicle.

5. Fire Fighting Measures

FLAMMABLE : Yes. **IF YES, UNDER WHAT CONDITIONS?** Forms explosive mixtures with air and oxidizing agents.

FLASH POINT (test method)	CLOSED CUP: -6.7°C (19.9°F). (Tag.)	AUTOIGNITION TEMPERATURE	190°C (374°F)
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FLAMMABLE LIMITS IN AIR, % by volume:	LOWER: 2	UPPER: 11.6
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EXTINGUISHING MEDIA:

CO2, dry chemical, water spray or fog.

SPECIAL FIRE FIGHTING PROCEDURES:

DANGER! Evacuate all personnel from danger area. Immediately cool cylinders with water spray from maximum distance taking care not to extinguish flames. Remove ignition source if without risk. If flames are accidentally extinguished. Explosive re-ignition may occur; therefore, appropriate measures should be taken; e.g., total evacuation. Reapproach with extreme caution. Use self-contained breathing apparatus. Stop flow of gas if without risk while continuing cooling water spray. Remove all containers from area if without risk. Allow fire to burn out.

UNUSUAL FIRE AND EXPLOSION HAZARD:

Flammable, corrosive gas. Forms explosive mixtures with air and oxidizing agents. Container may rupture due to heat of fire. To provide maximum containment up to cylinder burst pressure, Trimethylamine cylinders are not equipped with pressure relief devices. Do not extinguish flames due to possibility of explosive re-ignition. Vapours from this product may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges, or other ignition sources at locations distant from product handling point. Corrosive vapours may spread from the spill. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with approved device. Vapours are extremely irritating. Contact may cause burns to skin and eyes. No part of a container should be subjected to temperature higher than 52 C. Contact with mercury may cause explosion.

HAZARDOUS COMBUSTION PRODUCTS:

These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...).

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Possible, ground all equipment before use.

6. Accidental Release Measures**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**

DANGER! Immediately evacuate all personnel from danger area. **DANGER:** Corrosive, toxic gas. Use self-contained breathing apparatus and protective clothing where needed. Contact with flammable materials may cause fire or explosion. Reduce vapours with fog or fine water spray. Do not spray water directly on leak as this may cause leak to increase. Reverse flow into cylinder may cause rupture. Shut off leak if without risk. Ventilate area of leak or move leaking container to well ventilated area. Prevent runoff from contaminating surrounding environment. Corrosive, toxic vapours may spread from spill. Before entering area, especially confined areas, check atmosphere with appropriate device.

WASTE DISPOSAL METHOD:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 m high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see Section 16.

For other precautions in using ethylene, see section 16. For further information on storage, handling, and use of this product, see NFPA 55: Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders, published by the National Fire Protection Association.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Flammable, corrosive liquid and gas under pressure. May be fatal if inhaled. Do not breathe gas. Do not get liquid or vapours in eyes, on skin, or clothing. Safety showers and eyewash fountains should be immediately available. Use only in a closed system constructed of corrosion resistant materials. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only spark-proof tools and explosion-proof equipment. Keep away from heat, sparks, and open flame. **May form explosive mixtures with air.** Ground all equipment. Store and use with adequate ventilation at all times. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier,** be sure valve is closed, then install valve outlet plug tightly. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST: Explosion-proof, corrosion resistant, forced draft fume hood is preferred.

MECHANICAL (general): Inadequate.

SPECIAL: Use only in a closed system. Explosion-proof, corrosion resistant, forced draft fume hood is preferred. Explosion-proof, corrosion resistant, forced draft fume hood is preferred.

OTHER: Not applicable.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standards Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

SKIN PROTECTION: Nitrile or PVC is recommended for tertiary amines as a class. No information specific to trimethylamine available.

EYE PROTECTION: Wear safety glasses when handling cylinders, protective goggles and a full face shield wherever contact with product is possible.

Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

PHYSICAL STATE: Gas. (Compressed Gas.)	FREEZING POINT: -117.1°C (-178.8°F)	pH: Not applicable.
BOILING POINT 2.89°C (37.2°F)	VAPOUR PRESSURE 193 kPa (@ 20°C)	MOLECULAR WEIGHT: 59.11 g/mole
SPECIFIC GRAVITY: 0.66 @ -5 C LIQUID (Water = 1)	SOLUBILITY IN WATER, Appreciable	
SPECIFIC GRAVITY: 2.087 VAPOUR (air = 1)	EVAPORATION RATE >1 compared to (Butyl Acetate = 1): (Butyl Acetate=1):	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: 0.0025 g/ml	% VOLATILES BY VOLUME: 100% (v/v).	ODOUR THRESHOLD: Not available.
APPEARANCE & ODOUR: Colourless. Odour: Fishy. Ammonia-like		

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	Not available.
INCOMPATIBILITY (materials to avoid):	Aluminum, magnesium, copper, tin, zinc, mercury and their alloy acids, oxidizing agents, ethylene oxide.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition or burning may produce carbon monoxide/carbon dioxide/oxides of nitrogen.
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS OF REACTIVITY:	None known.

11. Toxicological Information

See section 3.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

13. Disposal Considerations**WASTE DISPOSAL METHOD:**

Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information**TDG/IMO SHIPPING NAME:**

Trimethylamine, anhydrous

HAZARD CLASS:

C L A S S 2 . 1 :
Flammable gas.

IDENTIFICATION #:

UN1083

PRODUCT RQ:

Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more

SHIPPING LABEL(s):

Flammable gas

PLACARD (when required):

Flammable gas

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations.

DSL (Canada)

This product is on the DSL list

WHMIS (Canada)

CLASS A: Compressed gas.
CLASS B-1: Flammable gas.
CLASS E: Corrosive gas.

International Regulations**EINECS**

Not available.

DSCL (EEC)

R20- Harmful by inhalation.

International Lists

No products were found.

16. Other Information**MIXTURES:**

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:**HMIS RATINGS:**

HEALTH 3

Product Name: Trimethylamine

MSDS# E-4662-H

Date: 10/15/2007

FLAMMABILITY 4
PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-705
PIN-INDEXED YOKE: Not available.
ULTRA-HIGH-INTEGRITY CONNECTION: None.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

AV-1 Safe Handling and Storage of Compressed Gas
P-1 Safe Handling of Compressed Gases in Containers
V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
--- Handbook of Compressed Gases, Fourth Edition

PREPARATION INFORMATION:

DATE: 10/15/2007
DEPARTMENT: Safety and Environmental Services
TELEPHONE: 905-803-1600

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

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